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ABSTRACT

A selected review of the effects of various grading systems on student motivation at the university level has been summarized and interpreted. Particular emphasis is devoted to contract grading and the identification of student characteristics, both personal and intellectual, that appear to interact favorably with this relatively new grading procedure. The limited literature dealing with the motivational effects of grades particularly at the university level is reviewed. A summary is presented of selected studies on contract grading that have implications for increasing student motivation. Suggestions for future research are presented; these are based on the principles of contract grading as they relate to an attributional theory of motivations. (Author/GK)

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The Effects of Contract Grading on Student Motivation

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ABSTRACT

A selected review of the effects of various grading systems on student motivation at the university level has been summarized and interpreted. Particular emphasis is devoted to contract grading and the identification of student characteristics, both personal and intellectual, that appear to interact favorably with this relatively new grading procedure. Suggested relationships between the principles of contract grading and various aspects of an attributional theory of motivation are proposed for researchers wishing to conduct investigations concerned with motivation and contract grading.

> In recent years there have been hundreds of articles in educational periodicals, scores of chapters in texts for teachers, and some reports of actual research in the field of school grades and grading systems. There is revealed much divergence of opinion on the reliability of grades, the method of their presentation, and even their necessity.

The paragraph above could well be an appropriate introduction to a number of articles dealing with grading problems encountered by educators in the 1980's. However, it is ironic when one realizes that the paragraph was written, with minor changes, in 1933! (Crooks, 1933, p. 259). The article by Crooks reviews problems that still confront a large section of the educational community. These include determining what proportion of various grades to give the better classes, the average classes, and the slower classes, determining the merits of curve grading versus absolute standards as well as debating the need for, and purposes of, assigning grades.

With all the educational research skills available during the last half century one would think that the so-called perennial problems of grading would by now have some agreed upon solutions. However, such is not the case. Recent annual volumes of Current Index to Journals in Education and Educational Index show no decrease in the number of published articles on grading problems. Unfortunately, the vast majority are of the "how I did it" type of article with minimal psychological theory involved and employing designs that severely restrict the generalizability of the procedures and findings described.

Given the above state of affairs, one should not infer that this article will report a final solution to problems related to grading. It will, however, deal with one important aspect of grading that has not received detailed study at the university level, namely, the motivational effects of different systems of grade assignments. In particular, the paper will discuss the topic from the perspective of a relatively new method of assigning grades : contract grading. The paper will first review briefly the limited literature dealing with the motivational effects of grades particularly at the university level. Secondly, a summary of selected studies on contract grading that have implications for increasing student motivation will be reviewed and finally, suggestions for future research will be presented that are based on the principles of contract grading as they relate to an attributional theory of motivation.

A simple procedure to use for the purpose of determining the motivational effects of grades is to ask students their reactions to the incentive properties of grades. Two reports on student reaction to grades will be cited mainly to emphasize the difficulty of finding any firm answer to the problem. Burke (1968) administered a questionnaire to 38 University of Minnesota students enrolled in a senior level course that emphasized the application of behavioral science concepts and theories to leadership and management situations. The responses to two questions, namely, "Do you think grading helps or interferes with 'learning'?" and "Why do you feel this way?" are of interest. Eight times as many students felt that grading interfered with learning rather than helped (66 percent versus 8 percent); and the remainder (26 percent) were undecided. Those who felt grading helped centered their reasons around

the motivational effects of grades, particularly for those students who lacked internal or self-motivation for learning. Students who felt that grading interfered with learning supported their opinion by the argument that the emphasis on a "good grade" makes grades rather than maximum learning become the goal of education. This type of student opinion has been countered by Ebel (1974) and Feldmesser (1972) who argue affirmatively for grades as extrinsic rewards.

A rather extensive survey in terms of numbers of respondents was conducted by Stallings and Leslie (1970) on students' attitudes towards grades. They administered a questionnaire on grading to approximately 3400 students enrolled at two campuses of the University of Illinois. It is of interest to note that in response to the statement "Grades provide me with motivation to do assigned course work", over twice as many students agreed with the statement than disagreed. A further breakdown of the data into class standing showed that within the five categories from Freshmen to Graduates, the agreeing students ranged from 60 to 70 percent. Comparisons across three colleges also revealed a surprising homogeneity of responses in that the agreeing students ranged from 62 to 71 percent.

Although the conflicting evidence between the two studies discussed above is of interest, the data do not present evidence of the effects of different grading systems on student motivation or achievement. The following four studies, however, do present some evidence.

Cullen et. al. (1975) conducted a relevant study at the high school level to investigate the effects of offering different classes various points related to final grades for completing an assignment (+2, +3, +5,

+6, +8, +10 and +12) or the loss of points for not completing the assignment (-1, -2, -3, -4, and -5). The 233 subjects from three suburban middle class high schools were divided among ten freshmen health classes, three junior psychology classes and one freshmen English class. A control class was asked to complete the assignment without gaining or forfeiting any points. A single instructor administered the assignment to all of the classes. As was expected, the results suggested that points used as an incentive elicited greater assignment completion than when no incentive was used, and as the level of incentive utilized rose, assignment completion tended to increase. Assignment completion was greater, however, when incentives (grades) were used as a negative as opposed to a positive incentive.

Another investigation at the high school level was conducted by Marshall and Christensen (1973) to determine the relative effects on student motivation and achievement of different levels of stringency in the assignment of letter grades. The subjects were enrolled in a beginning Spanish course and were divided into two matched groups of 32 students each on the basis of a standardized Spanish test. All papers, exams, short quizzes and other assignments required during the semester were marked consistently for all students across the two classes. However, before the work of the students in the experimental class was returned, it was adjusted up one letter grade level. Analysis of the results of six variables indicated that increased leniency in assigning grades did not significantly affect a single measure of student motivation or achievement. The authors concluded that the relative level of grading seems to have little impact on

motivation and achievement of most students and that the internalized perceptions of achievement level may be more significant determiners of student behavior than teacher assigned grades.

A study by Williams et. al (1975) attempted to determine the differential effects of a norm-referenced compared with a criterion-referenced grading system on student achievement and attitude. Grades for the undergraduate psychology course were based on the results of four multiple-choice tests. Standards for the norm-referenced class of 25 students were based on an individual's percentile rank within the class whereas for the criterion-referenced group of 28 students the grades were assigned on the basis of a pre-determined percentage correct scheme. The authors argued that the criterion-referenced students would perform at a higher level on the achievement tests than the norm-referenced students because the former's goals would be more specific and the students would perceive that they had more personal responsibility for improvement. The results did not confirm the researchers' hypotheses. Also there were non-significant differences found on all of the six attitude scales related to grading and other aspects of the course. However, results suggested that student knowledge of performance on tests administered early in the semester interacted with the grading systems to influence later test performance. Norm-referenced students who scored low on the first two tests fell considerably below a comparable group on the combined performance of the two later tests. Just the opposite occured for norm-referenced students who scored high on the initial tests. This disordinal interaction was statistically significant, a fact the authors explained by suggesting that the criterion-referenced grading system provides low

achieving students with knowledge early in the semester that they must increase their future performance while the knowledge provided to the norm-referenced students is that they are not competing successfully with their peers and thus are discouraged from continued effort. The authors argued that the initial high scoring students are affected differently in that the criterion-referenced group became very confident in their ability to meet the course requirements for a desired grade whereas their norm-referenced counterparts must always be conscious of the possibility of the rest of the class working harder and thus raising the testing standards.

Another classic study was conducted by Goldberg (1965) at the University of Oregon to determine the effects of different grading policies applied to the results of a first mid-term examination on subsequent test results of over 600 students enrolled in an introductory psychology course. Four different instructors teaching the same course but using different textbooks randomly applied a different grading system to each of their five discussion sections. All of the systems contained five grades (A-F) and were defined as follows: Strict (no A's and 30 percent F's), Lenient (no F's and 30 percent A's), Bimodal (no C's and 20 percent A's and F's), Normal (40 percent C's and 10 percent A's and F's) and Rectangular (20 percent for each of the five grades). A variety of statistical tests were carried out on the data, and as a result, the author concluded that the different grading practices had negligible differential motivational effects on the subsequent test performance of the students involved in the study.

A very thorough search was conducted by the author of this paper in an effort to find relevant research studies on the motivational effects of different conventional grading systems. However, the review provides very little in the way of definitive evidence on the motivational effects of conventional grading systems. Perhaps the reason is that typical grading systems are not integrated into the total course structure and are thus peripheral to the main activities of a course. Proponents of contract grading suggest that their grading approach is intimately related to all aspects of a course and thus has the potential for creating a pervasive influence on student motivation. It is toward this latter claim that attention will now be directed.

Contract Grading

Recently, some professors have organized their courses in such a way that students can, near the beginning of the course, choose and contract for a particular letter grade based on the work they believe they can accomplish. The system is predicated on clearly defined student activities ordered in terms of the quality and quantity of work, both of which increase as the letter grade level changes from D to A. Various approaches are used depending upon the nature of the course, the method of instruction and the characteristics of the students. In general, a course is organized in terms of projects, activities, and tests which are directly related to course objectives and classified in terms of letter grades. High grades are usually awarded to students who complete a certain number of required assignments plus an optional number of high quality projects while low grades are assigned to students who complete only the minimum essentials.

Proponents of the grade contract claim that the procedure allows a professor to individualize instruction and also reduce inter-individual competition for grades. Ideally, the contract is based on what one professor and one student spell out in writing as to exactly what will be accomplished during the course for a particular grade. On the basis of an explanation by the professor and through individual and class discussions, students decide the grade level to which they individually aspire, and a contract to this effect is then signed by the student and professor. Usually the contracts are organized through the use of tasks or points. The task system requires the student to complete selected tasks plus a certain number of others to receive a particular grade. For example, a contract may read: for a C, do the starred activities and any three

additional ones; for a B, any six additional activities; and for an A, any nine additional ones. The point system requires a student to accumulate a predetermined number of points related to various activities to receive a specific grade. For example, a student must accumulate 100 points for a C, 150 points for a B, 200 points for an A. In most contract systems, the standards for completing assignments, tasks, and tests are spelled out in detail and any unsatisfactory work may be re-done until judged acceptable provided it is completed within a pre-determined time schedule. If students complete the contract, they receive their grade. If, however, they meet only part of the agreement, only that level of the contract will be binding. Usually the printed contract, which contains a listing of required tasks or points and their due dates, is prepared in two copies, the professor and student each signing both copies and each keeping one for his own use.

In order to assess the value of contract grading as it relates to student motivation, a total of seven studies will be briefly summarized from the growing body of research on contract grading (Taylor, 1981). The first four studies are one-group designs in which the authors surveyed student opinions and attitudes related to the grading procedure as well as a number of other course activities. The second group of studies are multiple-group designsand deal with a variety of cognitive and affective factors relating to motivation and contract grading.

One Group Designs

Asteriadis (1976) surveyed 123 students enrolled in a required course in microbiology. Students were asked to respond anonymously to ten questions related to their experiences with contractual versus traditional grading. A review of the actual items on the questionnaire, however, highlights the fact that questionnaires are usually course specific and that generalizing the conclusions to other courses/classes should be avoided. Table 1 below is a condensed version of the responses to the questionnaire showing the total percentage of students who rated the question either above average or excellent as it applied to the contract and traditional grading approaches. The results showed conclusively that the students favored the contract approach.

Place Table 1 about here

Table 1

Responses to Questions Regarding Contractual vs Traditional Approaches*

Questions	Total percentage responding above average or excellent	
	Contractual	Traditional
1. The system is designed to encourage me to learn.	79	19
2. The system is designed to allow me to be responsible for my own education.	96	21
3. The system is designed so that I have the opportunity to investigate the issues I find interesting.	93	9
4. The system is designed so that I can use the type of learning situation best suited to me (e.g., tests vs reports).	98	4
5. The system is designed so that I have involvement in determining how I am to be evaluated.	99	1
6. The system is designed so that I have the opportunity to decide how much time and effort I need or am willing to devote to a course.	88	8
7. The system is designed so that there is more than one way to obtain the grade I desire.	99	2
8. The system offers a positive rather than a negative approach to the evaluation of my performance.	88	8
9. The system is designed so that grades are fairly and impartially assigned.	90	20
10. In general, which system better facilitates your educational needs?	91	12

*Adapted from Asteriadis (1976)

In a follow-up study, Parks and Zurhellen (1978) surveyed the opinions of 82 students with a 12 item questionnaire dealing with various aspects of contract grading used in three education courses. All items related to course interest and learning experiences significantly favored the contract approach ($p<.001$). Students felt that the method helped develop greater interest in the course and that more flexibility was allowed with less anxiety. They also felt that more information was retained using the contract approach and that the system promoted greater motivation (88 percent yes versus 12 percent no) as well as allowing for learning differences and greater possibilities for students to develop their own objectives. Students expressed the belief that the contract system could be effective in any college course and also expressed the willingness to have another course in which the grade contract would be used.

Staiger (1978) described a college level electronics course operated with a grade contract format during the fall semesters of 1975 and 1976. Staiger believes that the format enhances student motivation by making the goals apparent and by giving a reward (grade) for completed work. Student opinion on all eight items of a questionnaire clearly favored the contract approach. Of interest is the following total percentage response categorized as "above average or well above average" and "below average" to the statement: "Compared to the effort I usually put into a lab course, my effort in this lab course was:"

Year	Above or well above average	Below average
1975	60.5%	7.0%
1976	69.2%	2.6%

Warner and Akamine (1972) surveyed students on their attitudes toward the grade contract used in an undergraduate course in educational measurement and evaluation. Of the 176 students questioned, slightly less than one-half reported feeling highly motivated under the grade contract. About one-third of the students, however, felt that motivation was higher under the traditional grading system. Students had two main criticisms of the grade contract system. First, they thought it was too rigid in that the precise and careful planning of student tasks by the instructor made the system seem mechanistic and "closed". They also felt that the method of judging assignments as either satisfactory or unsatisfactory emphasized quantity of work at the expense of quality.

The foregoing short review which includes content areas as divergent as the study of microbiology and industrial education, shows that students in general tend to favour contract grading. The attitudes are, however, course specific and similar to those the authors had anticipated in implementing the grade contract method.

Multiple Group Designs

The following three studies supply data related to the main question of this paper; namely, does contract grading, compared with other grading procedures, have any effect on student motivation as expressed through either higher achievement levels on tests or higher scores on attitude or opinion scales? Criteria for selecting the studies were first, that there was at least one control group and, second, that the course extended over at least a term so that the grades assigned were final rather than those awarded to only one limited aspect of a course such as a unit or a project.

The first study reported is one by Blankenship (1977) who conducted the research as part of his doctoral dissertation. Unfortunately, the only convenient information available at the time the present article was written was an abstract of the study. Blankenship divided 57 students enrolled in an introductory food services management course into three groups (high, medium, and low) on the basis of their grade-point average. Members of each GPA group were randomly assigned to three groups of 19 students with high, medium, and low GPA subjects in each. Treatments were then randomly assigned to the groups. The only difference in the treatment groups during the course was the grading system which varied on the amount of instructor-student input. The regular system was totally instructor controlled. The contract system was instructor controlled with some student input while the weighted contract system involved fairly equal instructor and student input. Student preference ratings for the weighted contract system were significantly higher than for either the contract or regular system, and the contract system was rated significantly higher than the regular system. No significant differences were found among the

systems in the final letter grades for the course, although the contract and weighted contract students received higher grades. The mean scores on the final examination were not significantly different among the systems. The author concluded that contract grading, especially weighted contracts, should be used whenever possible because of the high student preference.

Most of the literature comparing grade contract with control groups has measured behavioral changes of entire classes. In such cases, individual variability due to relatively stable pre-existing personality differences was treated as error variance. However, an excellent study by Daniels and Stevens (1976) investigated the relationship between a contract grading system and students' internal-external locus of control. The interested reader is encouraged to consult the original study for more detailed information. In this study, approximately one-half of the internal and external students as classified on the locus of control dimension were randomly assigned to either a self-directed group (grade contract) or a traditional learning group (conventional grading). The results showed a strong interaction between locus of control and instructional methods with the dependent variable being a 75 item multiple-choice test administered at the conclusion of an eight week study of introductory psychology. A strong disordinal interaction was found, with internals performing better under the contract method and externals performing better under the teacher controlled method. Neither of the main effects (locus of control and method of grading) were significant.

Considering the limited evidence available in the literature to support disordinal interaction in aptitude-treatment research, this study stands out in that it lends support to the proposition that more effort should be

directed toward matching an educational method to the characteristics of students. According to Allan, Gait and Cherney (1974), who used a contract method of grading in an abnormal psychology and also classified their students in terms of the locus of control dimension,

> If external subjects can progress more rapidly and accrue more benefits from a semiautonomous, self-paced education, educators might give serious consideration to providing this option. It is necessary that not only intellectual inputs be the focus of education, but that individually appropriate motivational orientations be considered as well. (p. 972).

An interesting experiment by Polczynski and Shirtland (1977) employed the theory of expectancy, often referred to as goal path analysis, to study the motivation and effort of students enrolled in a course using contract grading. Expectancy theory suggests that in order to induce motivation, a desirable goal (in the case of a student, a high grade) must be presented and a path to that goal clearly specified. A student must also believe that the performance level reached through effort on his/her part will result in the attainment of the goal. The relationship between the student's performance and the goal is called instrumentality. In order to determine if contract grading did raise the instrumentality of students, an investigation was conducted wherein seven classes in business administration experienced contract grading while two classes experienced traditional grading methods. The results based on questionnaire returns from 280 students showed that there were statistically significant differences in favour of the contract classes on all three questionnaire items designed to measure instrumentality. The authors concluded that through contract grading it is possible to change levels of students' effort and motivation to perform by clarifying the path to the goal of grade achievement.

In general, the six studies cited that reported using contract grading all tended to favor the system in terms of its motivating effects on students. The concluding section of this paper suggests reasons why contract grading appears to hold high potential as a promoter of student motivation. It will be organized on the basis of an attributional analysis of contract grading.

The Relationship Between Contract Grading and Attribution Theory

Recently a number of researchers have developed explanations and interpretations of achievement related behavior in terms of attribution theory (e.g., Bar-Tal, 1978; Weiner, 1979). Bar-Tal (1978) describes attribution theory as being concerned with the problems of investigating causal perceptions. "An 'attribution' is an inference that an observer makes about the causes of behavior - either his own or another person's" (p. 259). According to Weiner (1979), a leading proponent of attribution theory, a student's beliefs about the causes of success or failure may be of major importance in understanding achievement related behavior. Weiner's research has shown that students view the causes of their academic successes and failures as principally being due to four major factors: their ability, their effort, the difficulty of the task, and/or good or bad luck. The theory suggests that ascribing any of the causes to either success or failure may have important affective and cognitive reactions. Interested readers should consult the articles by Bal-Tar (1978) and Weiner (1980) for an elaboration of these points.

From a state-of-the art paper on contract grading (Taylor, in press) and from the short reviews on contract grading earlier in this paper, a number of grading procedures and course organization approaches will be chosen and equated with the four principal attributions of achievement success as hypothesized by attribution theory. It is the thesis of this paper that contract grading allows a professor to organize materials and activities so as to foster in students the development of self-confidence, internal goal setting, personal responsibility and internal control of

behavior. The grade contract system has, therefore, the potential for allowing students to become causal agents, to become the origin of their own behavior. (For amplification of the latter concept see de Charms, 1976)

Table 2 presents an outline of some possible relationships between the four main attributions of success as hypothesized by attribution theory and their relationship to various procedures associated with contract grading. In a sense, Table 2 is exploratory and suggestive of possible relationships that researchers on contract grading may wish to investigate. The table is only a modest beginning, and it is hoped that those interested in improving the motivation of students will suggest additions and revisions so that a grading system may evolve that will aid in maximizing academic development.

Place Table 2 here

TABLE 2

Attributions of Success and Their Relationship to Contract Grading Procedures.

Hypothesized Causes of Success	Contract Grading Procedure
Ability	- Tasks are arranged in hierarchical order and students therefore choose only those that are at a level of complexity commensurate with their background and ability. An assumption is made that all students have the necessary pre-requisites needed for successful completion of the course. - At the beginning of the course students are told that they have the ability to complete the course at a high level.
Effort	- Assistance is available throughout the course to help students maximize their effort. Students know that effort will be rewarded directly because of the relationship between completed tasks and the grading system as described in the contract. (For the importance of goal setting conferences - an important part of the negotiating process in contract grading, see Gaa, 1979). - Options are available in the types of objectives/tasks that students may wish to complete for each letter grade. - Clearly stated objectives/tasks help channel effort. - Usually tasks/assignments may be re-submitted after formative evaluations. This procedure supposedly helps reinforce greater effort.

TABLE 2 con't

Hypothesized Causes of Success	Contract Grading Procedure
Effort (con't)	- Quantity as well as quality of work are intimately related to the level of grades awarded and therefore students know that greater effort results in higher grades.
Task Difficulty	- Tasks are organized sequentially and hierarchically and thus students can monitor their own progress. - Explicit criteria and standards for judging task completion are public knowledge prior to the beginning of the course. This procedure allows students to estimate the difficulty as well as the effort required to complete any grade level with maximum certainty. However, if tasks become too difficult students can stop at that letter grade level. - Emphasis is given to competency in the sense that students are permitted to re-submit unsatisfactory tasks in order to improve them. - Standards for examinations may be set in absolute terms with alternate forms available for re-writing if the score is below the standard required for a desired grade.
Luck	- Luck or random chance for success or failure is minimized in a course utilizing contract grading. An instructor acts as a facilitator. Therefore activities such as tests, which may contain large chance factors, are carefully designed with their table of specifications supplied to students.

TABLE 2 con't

Hypothesized Causes of Success	Contract Grading Procedure
Luck (con't)	- Conditions or methods to be employed in completing the contract are clearly stated. - Sufficient time is provided for personal meetings between students and the instructor for planning activities and negotiating the grade contract. - A timetable is available for completing each unit and for re-working any paper/ test/project.

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